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GEOLOGY DEPT.

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE • NOVEMBER 21, 1942

Vital Information
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A SCIENCE SERVICE PUBLICATION

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TINY GIANT WITH A HISTORY

Long before the war, the men who design your Bell Telephone System were looking for an electron tube with frequency capabilities never before attained. With it, they could transmit wide bands of telephone messages — several hundred of them — simultaneously through coaxial cable — economically, and over long distances.

They developed a tube which set a new standard in broad-band, high-frequency amplification. So minute that its electrode system had to be inspected under a magnifying glass, the tube could amplify either the voices of 480 people talking at the same time, or the patterns of television. Long-distance transmission became a commercial reality.

6AK5

When war came, this tube excelled all others as an amplifier in certain military equipment. It then grew into the 6AK5, one of the great little tubes of the war. Besides producing 6AK5's in large quantities, the Western Electric responded to emergency needs of the Army and Navy by furnishing design specifications and production techniques to other manufacturers, of whom at least five reached quantity production. On every battlefront it helped our ships and planes to bring in radio signals.

Developing electron tubes of revolutionary design has been the steady job of Bell Laboratories scientists ever since they devised the first practical telephone amplifier over thirty years ago. Now tubes like the 6AK5 will help speed the living pictures of television, as well as hundreds of telephone conversations simultaneously over the coaxial and radio highways of the Bell Telephone System.

BELL TELEPHONE LABORATORIES

Exploring and inventing, devising and perfecting for continued improvements and economies in telephone service.

MEDICINE

Flu Vaccine for Civilians

Effective against Types A and B, the vaccine is like that used for the Army and should be available by Dec. 1. No signs of an epidemic this winter.

➤ INFLUENZA vaccine of the kind now being given to all Army personnel will be available for civilian use by Dec. 1 or shortly after.

The vaccine is effective against Types A and B influenza. These are the types which have caused epidemics in recent years. Other types of influenza virus exist. Authorities do not know whether the world-wide influenza epidemic in 1917-1918 was due to A or B virus or to some other type.

Army studies, prior to the general vaccination order, showed that about 75% of those vaccinated were protected against influenza during outbreaks which occurred soon after the vaccination. How long the immunity, or protection, lasts is not definitely known.

The vaccine is given by hypodermic injection under the skin of a single dose of one cubic centimeter (about one-fourth of a teaspoonful).

Civilians whose physicians advise them to be vaccinated will find that the vaccine is expensive. Actual manufacturing costs are about 50 cents to one dollar per dose. Retail costs may be three to five times as much.

The vaccine is made from influenza virus grown on chick embryo. (See *SNL*, March 10). The following firms have been manufacturing the vaccine: Lederle, Squibb, Sharp and Dohme, Lilly, Pitman-Moore and Parke-Davis. Some manufacturers have already applied to the National Institute of Health for licenses to manufacture the vaccine for civilian use. Others will doubtless make similar requests soon and it is expected that firms which have not yet made the vaccine may do so in the future.

Influenza at present shows no signs of becoming epidemic this winter. Cases reported to the U. S. Public Health Service since Jan. 1 total about 85,000 compared to some 350,000 for the same period last year. Some widely scattered small outbreaks last spring led Army medical officers at that time to anticipate an epidemic this winter. Although it has not yet materialized, the possibility at that time led to plans for vaccination of all personnel as soon as sufficient vaccine was available. By October there was enough of the vaccine to order general vaccination.

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***GENERAL GET HIS**—Maj. Gen. Norman T. Kirk, Surgeon General, U. S. Army, is getting his influenza vaccine shot. Left to right, Gen. Kirk, Lt. M. Ellen Evans, Maj. J. C. Strong. Photograph by Fremont Davis, Science Service staff photographer.*

PHYSICS

New Atomic Particle Being Investigated

➤ A NEW SORT of atomic particle or system consisting of a positron (positive electron) hooked to an electron is being investigated as the result of some thinking aloud about its possibilities that Prof. J. A. Wheeler of Princeton University has presented to the metropolitan section of the American Physical Society.

One of the most elusive and short-lived particles in the subatomic world is the meson, also called the mesotron, which is one of the results of cosmic rays rushing into the earth's atmosphere. These mesons, discovered in 1937, exist only for a millionth of a second or less.

The new particle, or whatever it is, that Prof. Wheeler suggests may exist, is as short-lived, and is considered to be a combination of the electron (which is the unit of negative electricity) and the positron (the positive electron discovered in 1932), holding cosmic hands with each other. In fact, this meson-like entity may be two positrons and two electrons, combinations of two of one and one of the other, or even three of each.

The new atomic baby, if it exists, has not yet been named and probably will not be until physicists are more sure that it exists, but it may be called "electromeson," "polyelectron" or "polytron."

Prof. Wheeler has suggested how a trap could be set for the new entity to determine whether it exists. It seems that when the positron and the electron come together annihilation occurs and two gamma rays are produced, rushing away at right angles to each other (polarized, as the physicists say). So if there are set up some counting devices that click when the X-ray-like energy of gamma rays comes along, and if two of them at right angles to each other click as one, then the physicists will feel rather sure that a "polytron," or what they want to call it, did exist a few minute fractions of a second earlier.

No use for the polytron is foreseen, if it really is. But then before the late war lots of people, now frantic about atomic bombs, would have seen no use for the fission of the uranium atom, if they had known or cared.

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ELECTRONICS

Specialized Loran

SS Loran, developed as navigation aid for overland routes where standard loran is not effective, replaced radar in bombing Berlin.

➤ A SPECIAL kind of loran navigating system, another important wartime scientific achievement, replaced radar bombsights on Allied bombers during the last year of the European war in assisting them to locate Berlin and other enemy targets to drop their loads of destruction, it is now revealed. The Germans, by special receivers, found a way to detect approaching radar-using planes, but not those operating on loran.

SS loran, as the method is called, is a special variation of the standard loran, the long-range aid to navigation of both air and surface ships. SS stands not for steamship but "sky-wave synchronized." SS loran is particularly for use by aircraft on overland routes where the standard loran is not effective at ranges over some 200 miles. SS loran has an overland range four or more times as great.

Like the standard loran, the SS variety is a development of Radiation Laboratory on the campus of the Massachusetts Institute of Technology, a wartime research and development institution under the sponsorship of the Office of Scientific Research and Development.

Ships at sea or in the air are able to pick up two sets of waves from the land-based loran station, one a so-called ground wave that comes to them directly, and the other "skywaves" which are reflected waves from the sky, thanks to the reflection of the signals in the 160-meter band by the ionosphere. The ground waves of standard loran are used ordinarily, particularly in daytime.

Loran itself was one of the most tightly held secrets of the war. It consists of a vast network of radio stations which in effect spread into space an electric stopwatch accurate to a millionth of a seond. By means of a special receiver on board ship or plane a navigator picks up radio signals from two stations separately by about 400 miles, and by comparison can locate the geographical position of his craft with as great accuracy as is provided by celestial navigation based on shooting the stars or the sun with a sextant.

The loran receiver determines with great accuracy the difference in the time at which the two signals from the loran transmitting stations are received. Curves are printed on a navigation chart showing the loran lines of positions for various time differences. Since the areas of frequent travel by ships and planes are blanketed by the loran signals from several transmitters, the navigator can determine three or four or more such lines of position.

Where these lines cross gives the point known as a "fix" which represents on a simple navigation chart, with which the navigator is furnished, just where the craft is located.

One of the early recognized shortcomings of standard loran was its relatively short range over land, some 200 miles for the ground waves, while over sea water the range was about 800 miles. However, after sunset the skywave signals traveled as well over land as water with a minimum usable range of about 200 miles and a maximum of about 1,400 miles. Also, analysis of skywave readings indicated unusual stability with respect to timing, a stability which increased with distance.

Early in 1943, according to Prof. J. A. Pierce, head of the loran division at Radiation Laboratory in Cambridge, Mass., an experiment was arranged between two American loran stations, one being instructed to synchronize itself with the skywaves from the other during one of the nighttime periods when regular operation was not scheduled. Excellent synchronization was made and held. The tests were observed at the laboratory, and the readings taken revealed a line-of-position error of only about 0.5 mile. This experiment marked the birth of SS loran.

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GENERAL SCIENCE

Cultural Reconstruction Of Devastated Countries

➤ THE EDUCATIONAL and cultural reconstruction of the war-devastated countries will be a principal concern of an interim commission to carry on after United Nations Educational Scientific and Cultural Organization Conference adjourns.

This commission will remain in session in London to undertake urgent problems in the coming weeks. In its reconstruction work it will operate through UNRRA.

It will also promote scientific and cultural travel by experts, professors and students, and arrange exchanges between the various nations.

Paris has been recommended by the conference as the future seat of UNESCO.

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S C I E N C E S E R V I C E

"SEEING" SOUND—Here is a sound spectrogram of the words, "Science Service," that will be the basis of devices for translating sound into visible, easily understood patterns for the deaf. (See SNL, Nov. 17.)

CHEMISTRY

Streptomycin Structure

Synthesis of antibiotic that rivals penicillin as remedy may be the next step. Large scale production of the drug might then be speeded.

➤ THE ACTUAL chemical structure of streptomycin, antibiotic that rivals penicillin as a remedy for infections, has been worked out almost completely by a group of scientists at the research laboratories of Merck and Company. Details of part of the work are reported in *Science* (Nov. 16), by Drs. Norman G. Brink, Frederick A. Kuehl, Jr., and Karl Folkers.

With this knowledge of the chemistry of streptomycin it may be possible to synthesize and manufacture the drug. In that case patients and their physicians would not be dependent as at present on the amounts of material that can be obtained by the tedious process of growing the soil organism, Streptomyces, and extracting the chemical from it.

Development and manufacture of a master chemical for germ-fighting that could replace streptomycin, penicillin and other antibiotics, or of a series of such chemicals, each designed for overcoming a particular group of disease germs, is another possible result of the discovery of how one such substance is put together chemically in nature. Hope for this is less solid than for the synthesis of streptomycin, difficult as that undoubtedly will be. The germ-stopping activity of antibiotics may depend on the entire chemical structure of the various substances, not on any part of it, and may be lost when the original structure is altered.

Streptomycin itself, the Merck researchers find, breaks up into two portions to which they give the "convenient trivial names" of streptidine and streptobiosamine. Together they are made up of 21 carbon atoms, 37 or 39 hydrogen atoms (the scientists are still uncertain of two hydrogen atoms), seven nitrogen atoms and 12 oxygen atoms. Streptomycin has the "general constitution of a hydroxylated base (streptidine) attached through a glycosidic linkage to a nitrogen-containing disaccharide-like molecule."

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AERONAUTICS

General Arnold Gives New Words for New Age

➤ MOTORJET, turboprop, turbofan, turbojet, ramjet, pulsojet. These words "carry more meaning for Americans than any other six words I know," says General H. H. Arnold in his third report as commander of the Army Air Forces.

No one can understand the language of aeronautics, much less the language of the future, if he does not know the meaning of words such as these. They will be a part of every-day life. The coming of the jet-propulsion age assures this.

These six strange sounds describe six distinct methods of utilizing atmospheric oxygen for propulsion. Only two of the words have probably been heard before by the American public. The "pulsojet" or intermittent jet idea is incorporated in buzz bombs. The V-1, prized weapon of the Germans, made this word known. Planes like the P-80, the P-59 and the new British Gloster Meteor jet plane that now claims the world speed mark, all owe their power to the "turbojet," gas turbine and jet combination.

In the future you will see "motorjet" planes with enclosed propellers instead of exterior ones.

"Turboprop" planes will have gas turbine engines plus these propellers. The usual reciprocating engines will be replaced not only in these, but in planes using the "turbofan" plan, which employs a gas turbine plus a ducted fan. The "ramjet" principle is most suitable for super-high speeds. There will be no mechanical compression as of old, but a continuous jet with compression by aero-dynamic ram.

It may be all technical now. "Gasoline" was an unknown word not too long ago. Some of these sounds may get so common that babies will be saying "ramjet" along with "dada."

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PUBLIC HEALTH

Fewer Health Complaints Among Industrial Workers

➤ INDUSTRIAL workers have decidedly fewer health complaints, now that the war is over. They have less nervous indigestion, insomnia, cumulative fatigue and nervous exhaustion. Blood pressure readings are lower in employees over 45 years old.

These findings, from a survey begun last April and planned to continue into next year and to include several hundred plants of all sizes involving over 1,000,000 workers, were reported by Dr. C. O. Sappington of Chicago at the meeting of the Industrial Hygiene Foundation in Pittsburgh.

"Shorter hours of work and relief from pressure of production and the general anxiety generated because of the possibility of being called into the armed forces" are the reasons Dr. Sappington gives for the improvement in industrial workers' health.

"On the other hand," he stated, "in some quarters there has been an increase in the incidence of occupational disease in plants which have had no such experience during the years of the war emergency. This may be due to the laying off of professional personnel and termination of employment of others."

Referring to current labor problems, he said:

"One element in sustaining and maintaining an adequate industrial health service is the opportunity to maintain production at a high level. This interdependence is apparently overlooked in the battle for shorter working hours and more pay."

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PHYSICS—MILITARY SCIENCE

Banish Atom Production

General Arnold sees this as the best defense against the bomb. Advises also devising every possible active defense against an attack.

➤ GENERAL H. H. Arnold, in his report as commander of the Army Air Forces, confirms with high military authority the contentions put forth by the scientists who worked on the atomic bomb that the best and almost the only defense against this super-weapon is to make sure that it is not being made anywhere in the world.

This is one of three types of defense against the atomic bomb suggested by General Arnold:

"Make sure that nowhere in the world are atomic bombs manufactured clandestinely." The atomic scientists agree with this idea, and they urge further that the only real fundamental solution is world government or cooperation of some sort that removes the likelihood of war.

General Arnold advises also that we should devise every possible active defense against an atomic bomb attack, once launched. That this is a most difficult task is made clear by General Arnold. The chief difference between an atomic bomb and the largest type of conventional bomb lies in the immense destructive power of a single atomic missile. This means, General Arnold explains, that measures intended for protection against an atomic bomb attack must be highly efficient from the very start of a war if they are to be any good at all. And General Arnold remarks that our experience in this war has shown that it is most difficult to attain this goal.

True space ships traveling 3,000 miles per hour outside the earth's atmosphere are all but practicable today and General Arnold further predicts that "research will unquestionably bring them into being within the foreseeable future."

This is the type of projectile from which atomic bombs in the future could be launched, when strategic bombing such as developed by the Army Air Forces and weapons of the general type of the German V-2 rocket are countered by improved anti-aircraft defenses.

"There now appear to be insurmountable difficulties in an active defense against future atomic projectiles similar to the German V-2," General Arnold admits, but he feels that this should only intensify our efforts to discover an effective means for our defense.

Redesign of our country for minimum vulnerability to atomic bomb attack, which means complete dispersal of our cities and moving vital industries underground, is the third atomic bomb defense suggested by General Arnold. This, he feels, would be overwhelmingly expensive, and the unsolved technological problems would present the greatest difficulty.

Unceasing air patrol of the entire world would do much to prevent the illegal manufacture of atomic bombs in their present form, General Arnold suggests, but this would need to be supplemented by ground inspection. The air patrol would be possible through the use of air contingents made available to the Security Council of the United Nations Organization.

The atomic weapon makes offensive and defensive air power, always ready, in General Arnold's words, "the primary requisite of national survival."

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PSYCHOLOGY—MILITARY SCIENCE

Search for Ways To Prevent Aggression

➤ SEARCH for a countermeasure for the atomic bomb should include a search for ways to prevent aggression and must not be confined to the purely physical sciences, the *Infantry Journal* will say editorially in its December issue.

"The soldier, like others," states the editorial of this official organ of the U. S. Infantry Association, "needs to think about all conceivable ways of countering the atom. About what might come, for example, of spending two billion dollars on an exploration of human aggression—into an organized search for ways of keeping men from wanting to enslave and destroy their peaceful neighbors.

"This would be a 'counter to the atom' and to all war."

There have been two main kinds of military countermeasures in past history, the editorial explains. One was to find a better, more destructive weapon; the other is the block, the guard, evasion, improved protection. But a more destructive weapon than the atomic bomb potentially may be, appears to be a purely academic conception.

"That," goes on the editorial, "leaves the other kind of countermeasure to consider, the measure that might avoid or turn the atomic blow. What could that be? Armor against the tremendous heat which is the energy loosed from the atom? An underground civilization? A means of detecting the distant approach or the very existence of the prepared materials of atomic destruction? Or a means of setting them off at great distances? Scientists of high standing in atomic research have already stated formally and publicly that they see no hope of countering the weapon they helped develop."

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AERONAUTICS

Giant Plane to Test Size Of Efficient Craft

➤ AVIATION science may get some new answers to old questions when the giant Hughes H-4 cargo plane undergoes its final tests soon. The giant flying cargo boat, now nearing completion, dwarfs even Consolidated-Vultee's 204 passenger clipper and is designed to carry over 200 tons of cargo at a cruising speed of 175 miles an hour.

Aviation experts have long wondered whether efficiency increases or decreases with size. Some have considered that planes as large as the H-4 would require gas turbine engines instead of the reciprocating type used. Some have insisted that there must be a size limit to planes.

All of these questions may be partially answered when the first flight of the H-4 takes place. The plane is 220 feet long, 30 feet high and has a beam of 25 feet. The wing spread of 320 feet makes it even more gigantic in size.

Eight Pratt-Whitney radial engines totaling more than 24,000 horsepower drive the new-type 17-foot four-blade propellers and are expected to give the H-4 a top speed of nearly 220 miles per hour.

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Nylon, if one wants a technical definition, is a generic term for any long-chain synthetic polymeric amide with recurring amide groups as an integral part of the main polymer chain that can be formed into a filament with the structural elements oriented in the direction of the axis.

HYDROPONICS

New Soilless Gardens

Are now in production in British Guiana Air Base to provide fresh vegetables for AAF personnel. Constitute largest project of kind.

➤ SOILLESS gardening to produce green vegetables for AAF men still overseas in the tropics is going into production on the largest scale yet undertaken, at Atkinson Field in British Guiana. One hundred standard hydroponic beds, each 300 feet long, three feet wide and eight inches deep, are growing tomatoes, lettuce, radishes, cucumbers and green peppers rooted in sterile washed gravel through which a solution of nutrient mineral salts in water is flowed at 48-hour intervals. The project is described in some detail by Lt. Allen E. Pripps, C.A.C., in the *Military Engineer* (Nov.).

In charge of this and all other soilless gardening projects under the Air Corps Quartermaster is Kendrick W. Blodgett, a civilian horticulturist, who has AAF officers and men as his aides. First project on a large scale was set up less than a year ago on Ascension island, mid-Atlantic air base just south of the equator. It has proved so successful that new installations of the same kind were planned. The new project is four times the size of the original one on Ascension island. Two others are now being set up in the Pacific, on Coconut island and Iwo Jima.

Because of the ending of the war and the cutting down of the number of men to be supplied locally, the Atkinson Field project turned out a surplus of lettuce from the beginning. This, Mr. Blodgett states, is being shipped to other bases in French and Dutch Guiana, Trinidad, Brazil and Puerto Rico. The same will be done with tomatoes when the expected surplus of these vegetables develops.

In general, it has been the Army's policy to grow vegetables in the ordinary type of gardens where soil and other conditions make it possible, and to resort to soilless gardening where conventional horticultural methods are impracticable. Thus, Ascension island is a desert mass of volcanic cinders, with neither soil nor water—all the water used for all purposes, including the garden, has to be distilled from sea water. At Atkinson Field there is rainfall enough, but the soil is a dense, barren red hardpan. Coconut island consists mainly of sterile white coral sand and rock. Iwo Jima is very much like Ascension island, except that Iwo's volcanoes haven't stopped smoking yet. So if the boys are to have their tomatoes and radishes, they'll have to raise them hydroponically.

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ELECTRONICS

"Racon" May Guide Ships Safely Through Dense Fog

➤ SHIPS near land may proceed with safety through fogs so dense that lighthouse flashes cannot be seen, with the help of radar equipment on board and radar beacons on shore. The radar beacon, called "racon" for short, is another scientific war development from which the lid is now lifted. It did an important war job, and now promises to play an important part in the peacetime safety of commercial shipping.

Racon is an electronic beacon placed ashore at selected positions to serve both surface and air ships. When radar signals from transmitters aboard ship are received by the beacon, its transmitter is triggered and it gives out automatically an answering signal in code. The code is its station identification. A navigator is able to fix his position in relation to the beacon by means of a simultaneous plot of both range and bearing of the beacon from the ship on the scope of his radar.

One of the first war uses made of the radar beacon was in the English-developed IFF apparatus, the letters standing for "identification, friend or foe." The responding equipment was installed in planes. It operated only when actuated by an interrogating set on the ground or in another plane. The response was automatic and was given in the particular code set for the day. The pilot was unaware of the waves of the interrogating set and also of the response. If an approaching plane failed to give an answer, and the right answer, it was regarded with suspicion.

While the IFF was a British development, it was improved in America and practically all instruments used by the Allies were made in this country. Wider uses of the principles employed in the IFF were developed at the Radiation Laboratory in Cambridge, where the greater part of the government's research and development of radio and radar was carried out.

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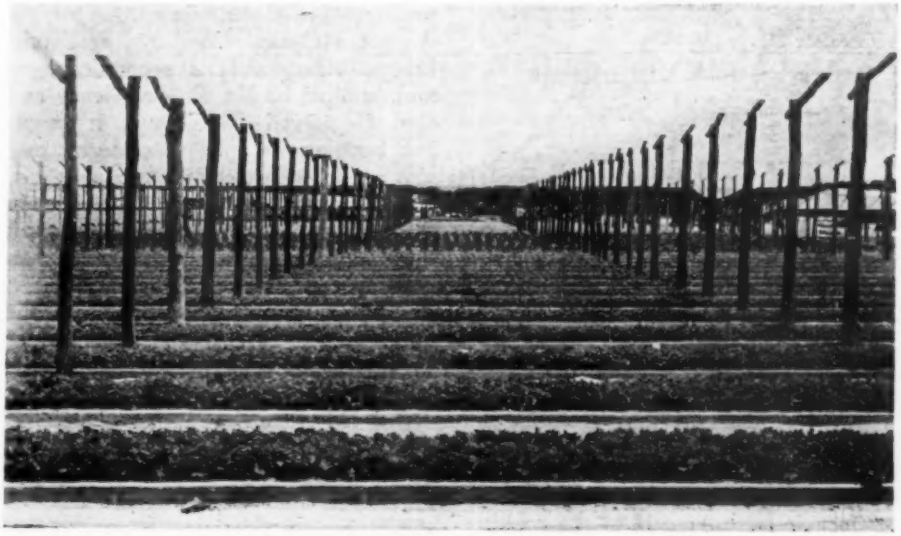
The *mung bean*, source of tender sprouts used in chop suey, is now grown in considerable quantities in the United States as a result of war conditions; the former supply came from China, India and Japan.



NO SOIL—Soilless gardens such as this one are in production at a British Guiana Air Base. These beds are growing lettuce.

PHYSICS

Pushbutton War Foreseen as Possibility

➤ A NEW KIND of pushbutton war through use of atomic bombs is visualized by Dr. E. U. Condon, newly named director of the National Bureau of Standards and technical adviser to the Senate's Atomic Energy committee.

The possibility of the diplomatic representatives of a foreign nation bringing atomic bombs piece-meal into the country under cover of diplomatic immunity, assembling them clandestinely, and then blowing the hearts out of all the leading American cities, is visualized by Dr. Condon, in an article written as Westinghouse associate research director, before he was given his government positions. (*Army Ordnance*)

"The next war should be described as the War of the Pushbuttons," Dr. Condon said. "For the atomic bombs are such small and simple devices that it is easy to visualize agents of an enemy nation bringing them in in small pieces, under cover of diplomatic immunity, and assembling them quietly in the closets or back rooms of their embassies and consular offices in our chief cities.

"Then when the decision to make war is reached, the ruler of the enemy nation has merely to say the word, and his agents in our country touch off the dozen or two bombs so planted in each of our major cities. And within minutes the entire hearts of each of them are utterly destroyed, and made to resemble the recently released photographs of Hiroshima."

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TECHNOLOGY

"Anhydrous" Vegetables Go on Market Soon

➤ VEGETABLES that are not merely dehydrated but "anhydrous" are the newest thing on the nutritional horizon. They are a development of Clarence Birdseye, pioneer in the quick-frozen foods industry, and are due to be offered on the public market soon.

Biggest advantage at the consumer's end is claimed to be the quickness and ease with which "anhydrous" vegetables can be reconstituted—that is, brought back to normal moisture content and made ready for cooking. As a matter of fact, it is really part of the cooking process itself. The dry vegetables are placed in a pot with enough salted water to cover them and brought to a boil as quickly as possible, then cooked over a lowered fire for a few minutes. That is all. Appearance and flavor are claimed to be indistinguishable from those of fresh vegetables.

They do, however, have to be prepared in cut-up form—riced, diced, sliced or what have you. You can't get a whole boiled anhydrous potato.

Secret of the new process, Mr. Birdseye stated, is the speed with which the water is extracted. In place of the 18 hours or so required in the customary drying process, "anhydration" is accomplished in an average of 90 minutes. Space and weight saving are described as enormous: five truckloads of vegetables that roll in at the receiving doors of the plant go out of the shipping door as one truckload.

The new vegetable products will be distributed by American Home Foods, Inc.

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OPTICS

Light Travels Fast Through New Glass

➤ A NEW TYPE of glass, in which the mineral beryllium fluoride is substituted for the silicon dioxide, or ordinary sand, used in conventional glass formulae, lets light go through at a higher speed than any other known glass, solid or liquid. Light velocity through beryllium fluoride glass is 146,000 miles a second, as compared with speeds of 186,000 miles a second in empty space, 140,000 miles a second in water, and 122,000 miles a second in the kind of glass used in spectacles.

The new glass has been produced experimentally in the laboratories of the American Optical Company, at Southbridge, Mass., and its properties have been studied by Dr. Estelle Glancy and Carl G. Silverberg. Because it causes less bending in a beam of light, and also produces less color-scattering effect, it may some day become valuable in the production of optical instruments.

At present, beryllium fluoride glass suffers from one serious handicap: it is hygroscopic, absorbing water from the atmosphere. If this can be overcome, and the glass produced in stable form, its useful career will begin.

Possibility of producing beryllium fluoride glass was first forecast on theoretical grounds in 1927 by a German scientist, V. M. Goldschmidt, who also predicted its low refractive index and low color dispersion. He apparently did not follow up his initial suggestion.

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IN SCIEN

PHYSICS

More Atomic Energy May Be Available

➤ ALTHOUGH scientists have split atoms with the consequence that the world has atomic energy and atomic bombs, there are many things about the elementary and fundamental particles of the universe that need further exploration.

The joint meeting of the American Philosophical Society and the National Academy of Sciences in Philadelphia heard Prof. John A. Wheeler of Princeton University raise new questions that need investigation.

Is there a possibility of converting into energy the entire mass of the neutrons and protons that make up the nuclei of all atoms? This was one question which if answered affirmatively might open the door to almost unlimited atomic power.

What are the relationships between various entities that occur in nature—neutrons, protons, neutrinos, photons, electrons, positrons and mesons?

Can one of these entities be transformed into another in the cosmic radiation and in stellar interiors? Prof. Wheeler asked.

Since man-made sources of high energy radiation are now available or in prospect, Prof. Wheeler said that scientists need to know what transformations of the elementary particles can be caused by such radiations and for which cosmic radiation will still be needed.

Science News Letter, November 24, 1945

CHEMISTRY

Boron Carbide Keeps Chemical Sample Pure

➤ ONE of the hardest mortar and pestles available is made of boron carbide, which is almost as hard as diamond. Glass can be ground into a fine powder with such a mortar and pestle set without marring the grinding surface, according to the *American Journal of Pharmacy*.

Boron carbide, made by heating boron and carbon in an electric furnace, is particularly useful in grinding substances for accurate analysis where the sample must be kept free from contamination.

Science News Letter, November 24, 1945

E FIELDS

MEDICINE

Two Anti-Malaria Drugs Now Announced

➤ ANNOUNCEMENT of two of the many drugs developed during the war as possible weapons against malaria was made at the joint meeting of the National Malaria Society and the Southern Medical Association in Cincinnati.

From the National Institute of Health came news that a compound short-named NIH-204 proved adequate, like atabrine, in suppressing malaria attacks but did not cure early attacks. Neither atabrine nor NIH-204 was able to prevent the infection in trials reported by Drs. G. Robert Coatney, W. Clark Cooper, Martin D. Young and Robert E. Burgess of the federal research institute at Bethesda, Md. NIH-204 was more fully identified as 9-(2-diamylamino-1-hydroxyethyl) 1, 2, 3, 4-tetrahydrophenanthrene hydrochloride.

A new drug which both prevents and suppresses bird malaria was reported by Drs. Emanuel Waletzky and Sterling Brackett of the American Cyanamid Research Laboratories at Stamford, Conn. This drug is called metachloridine. Its full chemical name is 2-metanilamido-5-chloropyrimidine.

It is now being tried in human patients but long trials will be needed, the scientists stated, to show whether it has possible value in human malaria.

Science News Letter, November 24, 1945

MEDICINE

Penicillin Reduces Scarlet Fever Quarantine

➤ ISOLATION, or quarantine as it is popularly called, of scarlet fever patients might be reduced from the usual three or four weeks to eight or 10 days by penicillin treatment. This is one tentative conclusion of a study reported by Dr. Manson Meads, Dr. M. Eugene Flipse, Jr., Miss Mildred W. Barnes and Dr. Maxwell Finland, of Boston City Hospital and Harvard Medical School, (*Journal, American Medical Association,* Nov. 17). The studies were made with the collaboration of Miss Ruth Drew and Miss Alice Northrop.

Penicillin, like the sulfa drugs, had little or no effect on the rash and "strictly toxic" phase of the illness.

Injections of the mold chemical into the muscles, however, banished the hemolytic streptococci of scarlet fever from the patients' noses and throats within 48 hours. If the treatment is continued, the original types of these germs do not reappear. This means that after seven days of treatment the patient is no longer a carrier of the germs and consequently no longer a danger to others. The week of penicillin treatment which banishes the germs is also believed to be effective in preventing complications of scarlet fever.

Penicillin sprayed into the nose and throat four to six times a day has very little effect on the germs in the throat though it seems to keep the nose free of hemolytic streptococci while the treatment is being continued.

Sulfadiazine given by mouth for seven days, the Boston scientists found, suppresses the number of hemolytic streptococci during the period of treatment only.

The studies were made on 36 scarlet fever patients ranging in age from four to 15 years. They were divided into groups of nine. One group was given sulfadiazine, one group penicillin by intramuscular injection, one group penicillin nose and throat spray, and the fourth group was given the usual scarlet fever treatment without sulfa drugs or antibiotics.

Science News Letter, November 24, 1945

CHEMISTRY

Zinc-Containing Fungicide Claimed to Be Superior

➤ A NEW chemical weapon useful in defense against the fungi that cause plant diseases has been prepared by chemists of E. I. du Pont de Nemours and Company, and will be ready for use by the opening of another crop season. It has been given the trade name "Zerlate"—short for zinc dimethyldithiocarbamate—and is claimed to be more effective than long-used fungicides based on copper and sulfur against certain plant diseases. A close chemical relative, which contains iron instead of zinc, is already in use under the name of "Fermate."

Zerlate combines readily with DDT and other insecticides, so that the same dusting or spraying can be used to combat both fungi and insect pests. It also has repellent action against some insects when used alone; one application is said to protect peaches against Japanese beetles for from seven to ten days.

Science News Letter, November 24, 1945

MEDICINE

Anti-Pellagra Vitamin For Malarial Headache

➤ TRIAL of nicotinic acid, the anti-pellagra vitamin, as a remedy for malarial headache is advised by Lt. Comdr. Meyer A. Zeligs, of the Navy Medical Corps. (*Journal, American Medical Association,* Nov. 17)

This headache is the most common and most disturbing symptom afflicting servicemen with chronic malaria during the interval between attacks of the disease, he found from experience at the Marine Barracks, Klamath Falls, Ore.

The patient usually wakes up with the headache which gets better after he has been up a few hours. Exercise, especially in the hot sun, however, almost always brings on severe headache. If the headache persists for a prolonged period, the patient may develop mild mental depression and seclusiveness, loses interest, and cannot stand physical exertion.

The reason for trying nicotinic acid in these cases is that this chemical dilates the blood vessels and enhances the flow of blood to the brain. A tendency for red blood cells containing malaria parasites to become "sticky" has been observed in patients dying of malaria of the brain. This stickiness might slow the flow of blood to the brain even in less severe cases and cause the headache, Dr. Zeligs reasoned. Nicotinic acid might counteract this.

The vitamin chemical relieved the headache in 10 out of 25 cases, he reports, and caused moderate improvement in seven, with no benefit in eight. Because it is a safe drug and no other remedy has been effective in relieving malarial headaches, Dr. Zeligs suggests that it be given further trial.

Science News Letter, November 24, 1945

ELECTRONICS

Electronic "Eye" Has Long-Range Detection

See Front Cover

➤ INFORMATION provided by radar's electronic eye is marked down on a vertical chart in the radar plot room of an Essex-class carrier during strikes against Japan early this year. Behind the transparent expanse of the giant circle, other enlisted men work on other aspects of the incoming flow of information. Official U. S. Navy photograph.

Science News Letter, November 24, 1945

ASTRONOMY

Total Lunar Eclipse

Some of the most brilliant stars in the heavens are visible during December, including the planets, Saturn and Mars. Eclipse of the moon is on the 18th.

By JAMES STOKLEY

➤ WITH DECEMBER bringing the typical evening skies of winter, we now have visible some of the most brilliant stars in the heavens. To these are added this December, right in the middle of the brightest of these orbs, two bright planets. And in addition, on the evening of Tuesday, Dec. 18, there will be a total eclipse of the moon, making the celestial menu for the month an unusually good one.

To the southeast is the brightest star in the night-time sky—Sirius, the dog star, in Canis Major, the greater dog. Its magnitude in the astronomers' scale is minus 1.6, though its brightness is now somewhat reduced because we see it low in the sky.

Directly above Canis Major, Orion, the warrior, is visible. This, perhaps the best known of all constellations after the Great Dipper, is recognized by reason of the three stars in a row which form Orion's belt. Above the belt and to the left is Betelgeuse, and at about the same distance in the opposite direction is Rigel, another star of the first magnitude.

Saturn Visible

About as high as Rigel and almost directly east is the lesser dog, Canis Minor, in which bright Procyon stands. And above Canis Minor are Gemini, the twins. It is in this group that one of our planets, Saturn, is seen. The two brightest stars in Gemini are Castor and Pollux, whose positions are indicated on the accompanying maps. These depict the appearance of the skies at 8:00 p.m. standard time, on Dec. 1, and 9:00 p.m. on Dec. 15.

The usual appearance of Castor and Pollux in the constellation is altered this month by the presence of the planet Saturn below and to the right, so that the twins temporarily seem to be triplets! Saturn, of magnitude zero, is considerably brighter than Pollux, which in turn exceeds Castor.

Still more brilliant is the second of our planets, Mars, which is just below Saturn. Its magnitude is minus 0.7, nearly twice as bright as Saturn. If this is not enough to distinguish Mars, there is also its characteristic red color. And on the evening of Dec. 21, at 7:05 p.m., EST, the moon passes close by, about two lunar diameters to the south.

A third planet is visible later in the night. About 2:00 a.m., around the middle of the month, Jupiter, with magnitude minus 1.4, nearly the same as that of Sirius, appears in the east. At sunrise it is on the meridian.

Exceeding any of these stars or planets in magnitude, with minus 3.4, is Venus but it is not well placed to view as it is only a little above the southeastern horizon at sunrise. A glimpse of it may be obtained if the sky is quite clear. Near it, on Christmas morning and a day or two after, Mercury, which is farthest west of the sun on the 26th, may be seen as well. It rises then about an hour and three quarters before the sun.

On Dec. 22, at 12:04 a.m., EST, winter begins. This event is called the winter solstice. The sun, which has been traveling southward through the sky since June, reaches the end of its path, and after this moves northward again. Because it is so far south, this is the shortest day of the year in the northern hemisphere. In the southern hemisphere it is the longest day—and the beginning of summer.

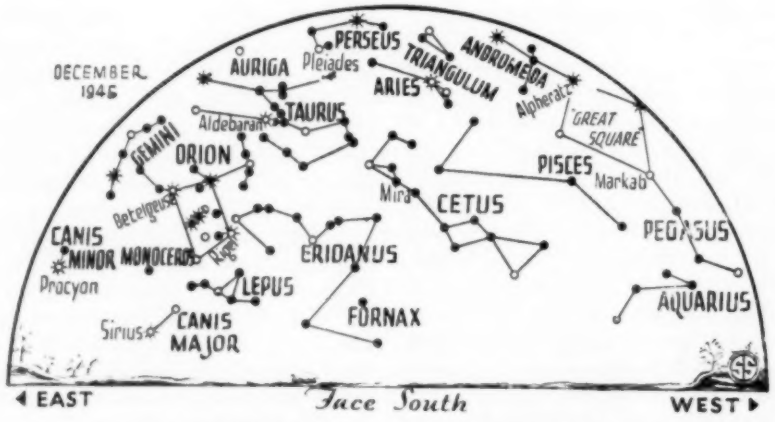
When, on the evening of Dec. 18, the moon goes through the shadow of the earth producing a total lunar eclipse, it will be the first seen generally in the United States since August, 1942. It is not, however, the first eclipse in that period, for last July there was one of the sun, caused by the moon's passing between the sun and earth. This was total in some parts of the northwestern United States and Canada, and partial over nearly all of the two countries.

The shadow of the earth, like that of the moon, has two parts. The core, or umbra, is the conical region where the sun is completely hidden by our planet. Outside this is a larger region, the penumbra, from which the sun would only be partly covered.

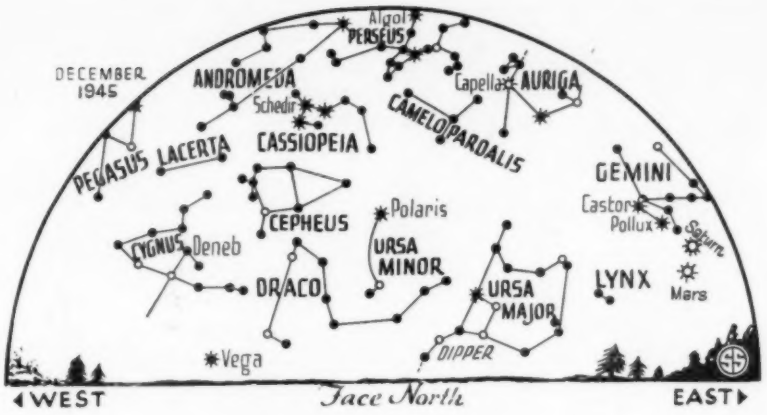
Eclipse on the 18th

On the evening of the 18th the moon enters the penumbra at 6:30 p.m. EST, but nothing will be visible until it is almost ready to enter the umbra, which it does at 7:37. The northeastern edge of the moon is the first to go into the inner shadow. As it advances farther, the shadow will be visible creeping across the moon's face, its curvature attesting to the roundness of the earth. At 8:40 p.m. the eclipse is total, with the moon completely in the shadow.

When this happens the moon does not completely vanish, even though it is completely cut off from the sun's direct light. The reason for this is that the atmospheric layer around the earth acts as a prism, bending some of the sunlight into the shadow. Passing through the air, the blue rays in this light are scattered—producing the blue color of the daytime sky. With blue removed, the residual



SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS



light is redder than normal, and so the moon, during a total eclipse, has a coppery red color.

At 10:00 p.m. the moon starts to emerge from the umbra, and at 11:03 is out of it completely, the last bit to be shaded being at the western edge. At two minutes after midnight, EST, the moon is out of the penumbra as well and the eclipse is entirely over.

In westerly parts of the country, the eclipse occurs earlier in the evening but even on the Pacific coast, where the end of the total phase comes at 7:00 p.m., PST, it will still be visible, since the evenings now are the longest of the year, because of the early sunset.

Celestial Time Table for December

Dec.	EST	
1	3:00 p.m.	Moon farthest, 252,400 miles
3	4:21 a.m.	Moon passes Venus
4	1:06 p.m.	New moon
7	4:00 p.m.	Uranus nearest, 1,694,000,000 miles
12	Early a.m.	Meteors of Geminid shower visible
	6:05 a.m.	Moon in first quarter
	10:00 p.m.	Mercury passes Venus
14	2:09 a.m.	Algol (variable star in Perseus) at minimum
16	10:58 p.m.	Algol at minimum
17	8:00 a.m.	Moon nearest, 224,100 miles
18	11:17 p.m.	Full moon—total eclipse of moon
19	7:48 p.m.	Algol at minimum
20	4:17 p.m.	Moon passes Saturn
21	7:05 a.m.	Moon passes Mars
22	12:04 a.m.	Winter commences
26	3:00 a.m.	Moon in last quarter
	10:00 a.m.	Mercury farthest west of sun
27	4:18 p.m.	Moon passes Jupiter
29	6:00 a.m.	Moon farthest, 251,800 miles

Subtract one hour for CST, two hours for MST, and three for PST.

Science News Letter, November 24, 1945

METEOROLOGY

Jobs for Weather-Men

The American Meteorological Society will help those discharged from the armed forces in their hunt for civilian jobs.

➤ YOUNG weather-men now receiving their discharges from the Armed Services will be helped by the American Meteorological Society in their hunt for civilian jobs along the lines of their special talents and training. Need for a placement service of this kind is sharpened by the fact that whereas there were about 500 trained forecasters and weather analysts before the war, special training programs to meet the sudden emergency needs have now swelled their number to something between 5,000 and 10,000.

Whether all these new meteorologists can be absorbed into civilian meteorology will have to depend to a considerable degree on developments in postwar industry and business. If civil aviation enjoys the rapid development that many expect, a considerable proportion of the young war-trained weathermen will find jobs there. Other types of business may be able to offer some jobs, though as a rule only after some additional specializing training. Although considerable interest in obtaining meteorological service has been expressed in business circles, relatively few firms have directly indicated a willingness to provide actual jobs themselves.

Probably the greatest number of openings will be in government service. The Weather Bureau can take on some men, and such agencies as TVA, the Geological Survey, the Army Engineers, etc., will find places for more, especially for those who can qualify in the special branch known as hydrometeorology.

Additional places may be found on the faculties of colleges and universities. Few institutions offered courses in meteorology before the war, but at least part of the many that added them to the curriculum after Pearl Harbor may want to retain them. In some instances there may not be enough teaching work in meteorology to keep a full-time instructor busy, but courses in weather science may be combined with instruction in mathematics, physics or other related subjects to make a fulltime job.

A detailed review of the situation, with suggestions for young meteorologists seeking jobs to follow, is given in the *Bulletin of the American Meteorological Society* (Sept.).

Science News Letter, November 24, 1945

INVENTION

Several Glass Sheets Inspected at Same Time

➤ QUICK inspection of a dozen or more large sheets of glass at the same time is made possible by a simple device on which U. S. patent 2,388,789 has been issued to L. I. Louviaux of Toledo, Ohio.

A common source of trouble in sheet glass, the inventor explains, is the type of flaw known as a ream. This is a small smear or gob of unhomogeneous glass within the sheet, having a different index of refraction from that of the rest of the glass. Inspection of glass sheets one by one does not always find the reams.

In Mr. Louviaux's invention, the glass sheets are stacked up on edge, nearly vertically, on both sides of a rack known as a buck. Into the narrow A-shaped space between the two stacks a frame carrying lamps and a reflector can be thrust. The inspector, looking at the stack from the outside, can see if there is a ream in any of the sheets, and by moving them one at a time isolate the faulty sheet and discard it.

Science News Letter, November 24, 1945

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Do You Know?

Frozen berries stored four months showed a 50% loss of vitamin C.

Larvae of *crabs* are called zoea, meaning "life".

The largest *mercury mine* in the world is the Almaden mine in Spain, which has been operated for over 2,000 years.

The *cotton boll weevil* came from Mexico by way of the southern corner of Texas in 1892 and spread over the cotton-raising country at a rate of about 60 miles a year.

Tannin, used to transform animal hides into leather, is brewed from the bark of certain trees and from tannin-bearing shrubs and leaves, in a process similar to brewing tea.

Synthetic *gum benzoin* now compares favorably in purity and cost with the Siamese natural product; it is used to fix the odors of incense, skin soaps, perfumes and other cosmetics, and in certain pharmaceuticals.

Electronic tubes can control the amount, direction and speed of an electric current, change alternating to direct current or direct to alternating, amplify it into greater power, and change it into radio or X-rays.

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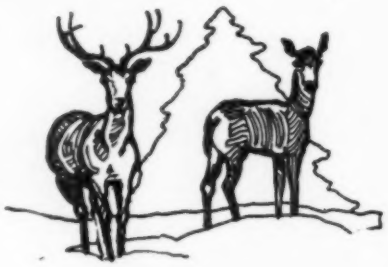
WILDLIFE

NATURE RAMBLINGS
by Frank Thone



Fat Measures Health

➤ FAT IS a good index to the general physical condition of deer in the winter, it has been demonstrated in field studies by Dave Harris of the South Dakota Department of Game and Fish, with headquarters at Deadwood, S. D. The less fat you find on a wintering deer, the nearer it is to starvation.

Deer come to the beginning of winter with considerable reserves of fat, stored in various parts of their bodies during their long summer of browsing. The carcass of a deer shot in autumn will have a layer of fat under almost all parts of its skin, with thicker masses on hips, saddle and elsewhere. There will be a great deal of fat around the internal organs, even a spot of fat on the heart. The marrow in the long bones will be white with fat.

As the summer browse-plants are banished by the onset of winter, the deer turns to less appetizing and less nourishing foods. These may fill the stomach, but they make no fat, and the animal begins to use up its reserves.

First to go are the outside layers and masses of fat—the deer loses its late-summer roundness, becomes more angular in outline. Later in winter, especially if the snows are deep and even winter browse is hard to get at, the hunger-pinch becomes more severe and the internal reserves are drawn upon. The carcass of a winter-killed deer will show very little visceral fat; and if the fat-spot on the heart is gone it is a pretty sure sign that the animal was really starving.

Indication of extreme distress is the disappearance of fat from the bone marrow. Deer in the final stages of malnutrition will have nothing in the long-bone cavities but a kind of red jelly.

Mr. Harris gives details of his studies in a report published in the *Journal of Wildlife Management,* (Oct.)

Science News Letter, November 24, 1945

PARASITOLOGY

Lice Bother Cattle Less In Summer Than in Winter

➤ CONTRARY to what might be expected, cattle lice are less troublesome in summer than in winter. Studies by agricultural scientists at Cornell University suggest that summer heat is the answer.

In the barn the skin temperature of a cow stays down around 90 degrees Fahrenheit, but when she goes out into direct summer sunlight her hide may have a surface temperature as high as 125 degrees. No louse can stand such hot weather for long. They all die except a few hardy and well protected stragglers who take refuge in the cow's ears, or on some continuously shaded area on her underside.

These few manage to hold on until the herd goes back into the barn in the fall. Then they begin to raise big families, and by mid-winter they are grandparents in a big way.

Science News Letter, November 24, 1945

CHEMISTRY

Adhesive Made from Yeast By High Temperatures

➤ YEAST, cultivated on waste sulfite liquor from paper and wood-pulp mills, can be made into a high-grade adhesive by heating it to between 160 and 220 degrees Fahrenheit, states Eric W. Eweson of New York City, who has obtained patent 2,388,910 on his process. There is enough sugar in the waste liquor to feed the yeast, and lignin, usually also present, adds adhesive value. Another source of raw material for this process would be yeasts spoiled for other purposes through over-age or moldiness.

Science News Letter, November 24, 1945

A *robin,* it is reported, made her nest on top of a brake cylinder under a passenger railroad car that made a 136-mile daily round trip; each evening she found the car and occupied the nest for the night.

The Southwest Pacific long-tailed *cuckoo* is one of the most remarkable migrants in the world; it nests in New Zealand and migrates to the Pacific equatorial islands when winter weather approaches the south.

Who is the most unusual person on your *Christmas List?*

Twelve Surprises plus another we'll add

Wouldn't he (or she) like a gift of twelve packages, one to arrive each month in 1946?

In each 1946 gift package, there will be one or more objects of science, and with each object, a museum-style legend card, which will tell at a glance what these things of science are. Included will be the sheets of explanation, that give the interesting details of discovery, of development, of manufacture, and that tell how to perform unusual experiments with the contents of the package.

Since late in 1940, packages like these have been going forward to members of the THINGS of science group. Glance over this list, then decide whether a membership which brings monthly packages on subjects as widely varied as these, isn't just the thing for that most unusual person on your Christmas Gift list.

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- Nylon
- Fiberglas
- Seeds, Medicinal and Condiment Plants
- Sulfur
- Treated Wood and Cloth
- Buoyant
- Salt
- Synthetic Rubber
- Transparent Packaging
- Casein
- Plywood
- Coal By-Products
- Lithium
- Upholstery
- Cork
- Rayon
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- Felt
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- Lignin
- Glass Fiber
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You know one or more who would thank you again and again for such a gift. If you are not yourself a member, you could hint to someone that you'd like it as a gift yourself.

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GEOLOGY

International Problem

Nations that need oil most, except America, have only minor natural resources. Commission should allocate petroleum products to countries needing them.

➤ THE IMPORTANCE of oil in world economy is indicated by proposals under discussion at the London Anglo-American conference, particularly the idea of an international commission to deal with present and future problems concerning the development of old and new reserves and the allocation of the petroleum products to the countries needing them. The nations that have the greater needs for petroleum, except the United States, have only minor domestic reserves, if any, and even American needs may soon require oil imports because of war drains and future expanded uses.

Atomic power may some day replace some of the present-day power-creating fuels, but not in the immediate future. Even if atomic power is used in the larger power plants, petroleum will be needed for many decades for diesel engines, heating plants and to operate automobiles. The world supply is ample for many years, and oil and gasoline can be made from oil-shale and coal.

However, the process is not simple, and nations depending upon synthetic fuels for their war equipment might find themselves at the mercy of those with natural supplies, as Germany and Japan now know. In addition to fuels, lubrication greases for machinery are essential to operation, and most of the greases found satisfactory for this purpose are petroleum products. Petroleum chemicals are also important, but many of these can be made from coal.

The United States, in the past, has worried very little about its supply of oil. The situation has changed, however, as a result of the war, during which America provided about two-thirds of the needed oil to power not only American fighting equipment but that of the other Allies as well. Known reserves have been drawn on heavily. New reserves may be located, and better recovery methods developed to get a larger percentage of the crude from under the ground, but the United States must look forward to possible importation.

The importance of oil in world economy becomes apparent by a survey of the countries using it and the regions where it is mined. The industrially developed nations are the greater users, but, with the exception of the United States, they are only minor producers. Western Europe, for instance, mines very little petroleum, but needs much. Soviet Russia seems to have plenty for its own need, and Romania produces for export. Production in Poland, Czechoslovakia, Germany, France and England is very small. Australia and Brazil are other countries undergoing rapid industrial development which now rely almost wholly on imported mineral liquid fuels.

The principal oil-producing nations in the Western Hemisphere are the United States, far in the lead, together with Venezuela, Mexico, Colombia and Trinidad. Northern Alaska has oil reserves now under development which soon may play an important part in the American supply.

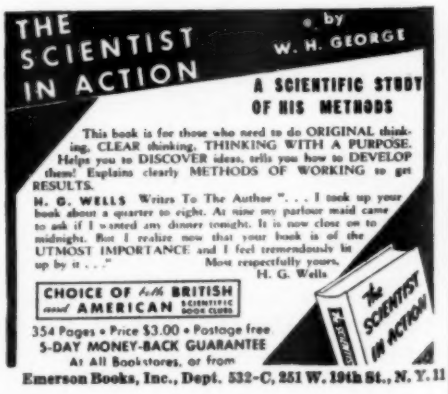
Africa produces very little oil at present, the principal production being in Egypt. An American oil company has just secured oil concessions in Ethiopia, an indication that its geologists, from preliminary studies, believe that important reserves may be found.

The Netherlands Indies, particularly Sumatra, Java and Borneo, are rich sources of oil and in the future will play an increasingly important part in the oil industry. Relatively little exploration has been carried out in this vast Netherlands area so the full possibilities are as yet unknown.

Asia has vast quantities of known oil, particularly in the Arabian-Iran region. Burma is also important and both China and Japan produce some. Sakhalin island, off the coast of Siberia, was a Jap source of oil in prewar and early war years. The Middle East fields in Arabia are particularly rich, one American authority stating that these fields are incomparably richer than those in this country.

"The really rich areas in oil as proved by drilling," Robert E. Wilson, president of the Pan-American Petroleum and Transport Company, stated recently in an article in *Mining and Metallurgy*, "are in the large basins alternately lifted and depressed between major continents—the Caribbean area, including our Gulf Coast, Venezuela, and Colombia; the great area between Europe and Asia, which has the tremendous reserves of Arabia and Iran; the intercontinental area of the Netherlands Indies between the continents of Australia and Asia; and finally, the area around the Arctic ocean, in northern Russia and around Alaska, which may prove a rich area but which, because of physical difficulties, has not as yet been explored."

Science News Letter, November 24, 1945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Books of the Week

➤ IMPROVED methods of navigation, up-to-date information concerning the internal constitution and age of the earth; and new observations of the planets and their satellites are included in the revision of ASTRONOMY, Vol. I, by Henry Norris Russell, Raymond Smith Dugan and John Quincy Stewart of the Princeton University Observatory. (*Ginn*, $3.)

Science News Letter, November 24, 1945

➤ VIRUSES are still much-disputed things; it is not even fully agreed whether they are living organisms or remarkably lifelike, complex, but non-living protein molecules. Dr. Frank M. Burnet regards them as living, and so presents them in VIRUS AS ORGANISM. It may be a good thing that virus particles are all but invisible, since this does away with the temptation to concentrate on their morphology and leaves a study of their behavior as the only practical avenue of approach. This avenue Dr. Burnet exploits fully, with close observation and shrewd deduction on virus evolution, physiology, host-relations and general ecology. (*Harvard Univ. Press*, $2.)

Science News Letter, November 24, 1945

Just Off the Press

ACTIVE PSYCHOTHERAPY—Alexander Herzberg—*Grune*, 152 p., $3.50.

AMERICA'S INDIAN BACKGROUND—Edwin F. Walker—*Southwest Museum*—19 p., with tribal map, 30 cents.

AMPUTATION PROSTHESIS—Atha Thomas, M.D., and Chester Haddan—*Lippincott*, 291 p., illus., $8.

THE CALENDAR STICK OF TSHI-ZUN-HAU-KAU—Robert H. Merrill—*Cranbrook Inst. of Science*, 12 p., illus., 35 cents.

EVERYDAY PROBLEMS IN ECONOMICS—May Wood-Simons—*American Technical Society*, 544 p., illus., $3.50.

FLUOROCHEMISTRY—Jack De Ment—*Chemical Pub. Co.*, 796 p., $14.50.

FUNGICIDES AND THEIR ACTION—James G. Horsfall—*Chronica Botanica*, 239 p., $5.

THE HERBAL OF RUFINUS—Lynn Thorndike—*Univ. of Chicago Press*, 475 p., $5.

HOLLYWOOD QUARTERLY—*Univ. of Calif. Press*, 129 p., $1.25 per issue, Vol. 1 No. 1. New magazine presenting the record of research in motion pictures and radio for a clearer understanding of their social, educational and aesthetic functions.

THE IROQUOIS: A STUDY IN CULTURAL EVOLUTION—Frank Gouldsmith Speck—*Cranbrook Inst. of Science*, 94 p., illus., $1.

THE LOST WOODS: ADVENTURES OF A NATURALIST—Edwin Way Teale—*Dodd*, 321 p., illus., $4.

THE NATURE OF COSMIC RAYS—W. F. G. Swann—*Sky Publ. Corp.*, 31 p., illus., 50 cents.

THE NEWSPAPER: ITS MAKING AND ITS MEANING—by members of the staff of The New York Times—*Scribner*, 207 p., $2.

THE PSYCHOLOGY OF SEEING—Herman F. Brandt—*Philosophical Lib.*, 240 p., illus., $3.75.

RACE AND DEMOCRATIC SOCIETY—Franz Boas—*J. J. Augustin*, 219 p., $2.50.

THE ROLE OF THE AGED IN PRIMITIVE SOCIETY—Leo W. Simmons—*Yale Univ. Press*, 308 p., $4.

VOLCANOES DECLARE WAR—LOGISTICS AND STRATEGY OF PACIFIC VOLCANO SCIENCE—T. A. Jaggar—*Paradise of The Pacific, ltd.*, 166 p., illus., $3.75.

"YOUNG MAN, YOU ARE NORMAL"—Earnest Hooton—*Putnam*, 210 p., illus., $2.50.

Science News Letter, November 24, 1945

MEDICINE-PHOTOGRAPHY

Easy-to-Use Camera For Surgical Operations

➤ A NEW aid to the surgeon who wants to record pictorially the details of a new operation or technic but who has no expert photographer at his service was demonstrated for the first time at the meeting Nov. 12 to 15 of the Southern Medical Association in Cincinnati.

It consists of an easily operated, high-speed camera developed by the Army's Pictorial Service for the Surgeon General's Office. Black and white or color still pictures on 35 mm. film can be taken indoors and outdoors at distances of from six inches to 12 feet. Every phase of the picture-taking except focussing and clicking the shutter is automatic.

The camera was devised from an idea originally conceived by Capt. Rollin W. King and Emanuel Berlant. It weighs approximately 5½ pounds, is operated from a portable electric power pack, which weighs approximately 27 pounds, and it may be plugged into any ordinary current line.

The camera contains its own built-in light source, a coiled circular quartz vapor discharge tube. The tube, designed and constructed by the General Electric Company, gives a flash of approximately 1/25,000 of a second duration, too short a period of time to harm the eye.

The device has been used by the Medical Corps to photograph open eyes at close-up ranges. It is estimated that the flash tube is capable of withstanding the strain of 50,000 flashes, each of which, at its peak intensity, is brighter than sunlight. The brilliance of the flash is so great that the surrounding general illumination of the subject need not be taken into consideration.

Due to the extremely rapid flash discharge, the camera has a phenomenal motion-stopping ability, which is capable of "freezing" the whirring of a moving fan blade.

Four models of the camera are now in existence, and others are being developed.

Science News Letter, November 24, 1945

CHEMISTRY

Acid Treatment For Pulp Production

➤ TWO SWEDISH inventors, A. J. A. Asplund of Alsten and J. W. Holst of Stockholm, offer a new process for digesting straw and other cheap cellulose materials for the production of paper pulp. Instead of employing the time-honored alkaline sulfate or acid sulfite processes, they use dilute sulfuric or other acid, under steam pressure, and follow the chemical digestion with appropriate mechanical beating, washing, etc. Rights in their patent, No. 2,388,592, are assigned to Aktiebolaget Defibrator, a Swedish corporation.

Science News Letter, November 24, 1945

The *loon* is the champion bird diver and swimmer.

THESE SELSYN MOTORS

are available at much less than production cost! Take advantage of this opportunity to purchase from stock. Selsyn Motors have many applications, from indicating the angle of bridges and lock gates, levels of liquids, and direction and speed of wind, to communicating the volume of gases in tanks many miles distant. Made with three-pole, three-phase wound stators and two-pole rotors with winding for connection to single phase A.C. Designed for use on 115 volts, 400 cycles A.C., for experimental purposes it will operate on 15 to 25 volts, 60 cycles A.C. and on other frequencies. The rotor voltage is 115 and the stator, 90. The estimated torque gradient in ampere degrees is .05, meaning the in.-oz. per degree measured between two identical machines. The excitation is .75 nominal amperes and 8.2 nominal watts. No. S670 Selsyn Motor, $7.50 each ($6.75 in lots of 4—$6.37 in lots of 8—$6.00 in lots of 12).

CENTRAL SCIENTIFIC CO.

1700 Irving Park Road, Chicago 13, Ill.

New Machines and Gadgets

❁ *DISPOSABLE toothbrush, for one-time use in railway and bus stations, and other places, has a flat, rigid handle made of a material that softens and sufficiently disintegrates in water to be deposited safely in the toilet after use. Its tiny brush is impregnated with a dentrifice.*

Science News Letter, November 24, 1945

❁ *WEDGE-SHAPED rain gauge, made of a transparent plastic, is graduated on one rectangular face so that water-level readings may be taken without the use of a measuring rod.*

Science News Letter, November 24, 1945

❁ *CEREAL TOASTER, to restore crispness to breakfast foods, is a narrow metal box with perforated sides that fits into the bread space of an ordinary electric toaster. After the cereal is properly heated, the container is removed by an insulated handle.*

Science News Letter, November 24, 1945

❁ *ILLUMINATED electric flatiron has a slightly projecting metal cover with downward-curved edges under which several tiny lamps are placed. The light from the lamps is reflected to the edges of the ironing surface.*

Science News Letter, November 24, 1945

❁ *HEALTH LAMP for humans and poultry emits a combination of germ-killing and health-giving radiation. Its action depends upon a new chemical phosphor,*

shown in the picture, a fluorescent powder used on the inside wall of a tube that converts some of the germicidal waves from a mercury discharge lamp into ultraviolet rays.

Science News Letter, November 24, 1945

❁ *COMPOUND screw, for use in wood, has a threaded shank of two or more sections of different diameters instead of the uniformly tapering shank. The lower, pointed section may be without threads so that it can be driven into the wood with a hammer.*

Science News Letter, November 24, 1945

❁ *ASH REMOVAL and shifting device, by the turning of a crank, draws the ashes out of a furnace, sifts them, and dumps the ash dust and partially burned coal into separate containers. An endless screw, similar to that in the familiar kitchen meat grinder, forces the ashes forward from a trough fixed under the grate.*

Science News Letter, November 24, 1945

❁ *COMB, for use by barbers in cutting hair, has every second tooth about half the length of the others, and every second space between the teeth deeper than between the others. This comb permits a three-way cut to be made with one stroke, it is claimed.*

Science News Letter, November 24, 1945

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, *1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 286.*

Books

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